

General Description

Maxim's IH5048-IH5051 analog switches are designed for applications requiring low leakage. They feature extremely low on resistance (30 Ω typical) as well as quiescent power-supply current below 1µA. Switch control inputs are fully compatible with both CMOS and TTL logic.

These switches are plug-in upgrades for the original manufacturer's devices, with improved specifications for analog-signal range and switch on and off times. They are also pin-compatible with the IH5040 family of analog switches. The IH5048 series is supplied in 16-pin DIP and SO packages.

Applications

Precision Sample-and-Hold Circuits Transducer and Sensor Switching Low-Level Signal Conditioning Battery-Powered Instrumentation Programmable-Gain Amplifiers

Features

- ♦ Low Charge Injection (10pC Typ)
- Quiescent Current Below 1mA
- TTL and CMOS Compatible
- ♦ Low On Resistance (25Ω Max for IH5048A)
- ♦ Latchup-Proof Construction

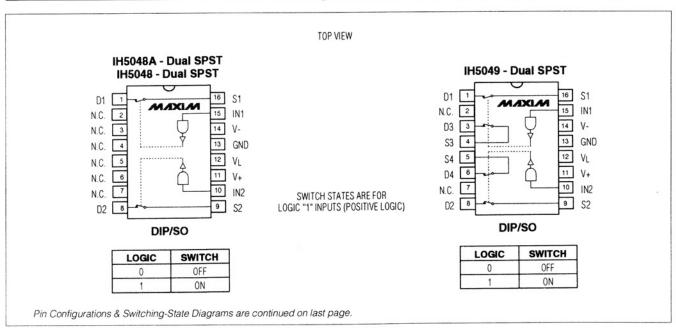
Ordering Information

PART	TEMP. RANGE	PIN-PACKAGE
IH5048CPE	0°C to +70°C	16 Plastic DIP
IH5048CWE	0°C to +70°C	16 Wide SO
IH5048CJE	0°C to +70°C	16 CERDIP
IH5048C/D	0°C to +70°C	Dice*
IH5048MJE	-55°C to +125°C	16 CERDIP**
IH5048ACPE	0°C to +70°C	16 Plastic DIP
IH5048ACWE	0°C to +70°C	16 Wide SO
IH5048ACJE	0°C to +70°C	16 CERDIP
IH5048AC/D	0°C to +70°C	Dice*
IH5048AMJE	-55°C to +125°C	16 CERDIP**

Ordering Information continued on last page.

- * Contact factory for dice specifications.
- ** Contact factory for availability and processing to MIL-STD-883.

Pin Configurations & Switching-State Diagrams



ABSOLUTE MAXIMUM RATINGS

V+ to V
V+ to V _D
V _D to V
V _D to V _S
V _L to V
V _L to V _{IN}
V _L to GND
V _{IN} to GND
Current (any terminal)
Digital Inputs (V+ + 0.3V) to (V+ - 38V)
Vs or VD (Note 1)0.3V to (V+ + 0.3V)

Continuous Power Dissipation (1A = +70°C)
Plastic DIP (derate 10.53mW/°C above +70°C) 842mW
Wide SO (derate 20.00mW/℃ above +70℃) 1600mW
CERDIP (derate 10.00mW/℃ above +70℃) 800mW
Operating Temperature Ranges:
IH50C/IH50AC0℃ to +70℃
IH50_M_/IH50_AM55℃ to +125℃
Storage Temperature Range65°C to +150°C
Lead Temperature (soldering, 10sec) +300°C

Note 1: Signals on S, D, and digital inputs that exceed V- or V+ will be clamped by internal diodes. Limit forward diode current to 30mA maximum.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

(V+ = 15V, V- = -15V, V_L = 5V, T_A = +25°C, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS		IH50M IH50AM		IH50_C IH50_AC			UNITS	
				-55°C	+25℃	+125℃	0°C	+25C	+70C	
	IIN(ON)	VIN = 2.4V		±1	±1	±10	±1	±1	±10	
Input Logic Current	IIN(OFF)	V _{IN} = 0.8V		±1	±1	±10	±1	±1	±10	μА
Input Logic Low	VIL			0.8	0.8	0.8	0.8	0.8	0.8	٧
Input Logic High	VIH			2.4	2.4	2.4	2.4	2.4	2.4	V
Drain Cauras On Basistanas	rds(ON)	Is = 10mA,	IH5048A only	25	25	35	30	30	45	
Drain-Source On Resistance		$V_D = \pm 10V$	All others	40	40	60	45	45	75	Ω
Channel-to-Channel rDS(ON) Match	ΔrDS(ON)				8 (typ)			8 (typ)		Ω
Minimum Analog Signal Handling Capability	VANALOG			±14	±14	±14	±14	±14	±14	٧
Switch-Off Leakage Current	ID/IS(OFF)	VANALOG =	-10V to 10V		±1	±100		±5	±100	nA
Switch-On Leakage Current	ID(ON) + IS(ON)	VD = VS = -	10V to 10V		±2	±200		±10	±200	nA
Switch-On Time	ton	Figure 1			400			600		ns
Switch-Off Time	toff	Figure 1			200			300		ns
Charge Injection	QINJ	Figure 2 (No	ote 2)		10 (typ)			10 (typ)		рС
Minimum Off-Isolation Rejection Ratio	OIRR	Figure 3, CL	. < 5pF		54 (typ)			50 (typ)		dB

ELECTRICAL CHARACTERISTICS (continued)

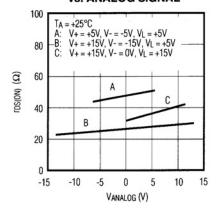
(V+ = 15V, V- = -15V, V_L = 5V, T_A = +25°C, unless otherwise noted.)

PARAMETER	SYMBOL CONDITIONS	CONDITIONS	IH50M IH50AM			IH50C IH50AC			UNITS
			-55°C	+25°C	+125℃	0°C	+25C	+70C	
V+ Quiescent Current	I+Q	V _{IN} = 0V or 5V	1	1	10	10	10	100	μА
V- Quiescent Current	I-Q	V _{IN} = 0V or 5V	-1	-1	-10	-10	-10	-100	μА
+5V Quiescent Current	ILQ	V _{IN} = 0V or 5V	1	1	10	10	10	100	μА
Ground Quiescent Current	IGND	V _{IN} = 0V or 5V	1	1	10	10	10	100	μА
Minimum Channel-to-Channel Cross-Coupling Rejection Ratio	CCRR	One channel off (Note 2)		54 (typ)			50 (typ)		dB

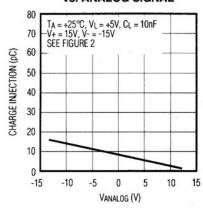
Note 2: Not production tested.

Typical Operating Characteristics

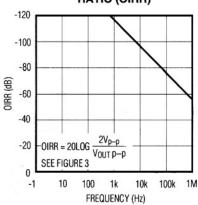
DRAIN-SOURCE ON RESISTANCE vs. ANALOG SIGNAL



CHARGE INJECTION vs. ANALOG SIGNAL



OFF-ISOLATION REJECTION RATIO (OIRR)



Test Circuits

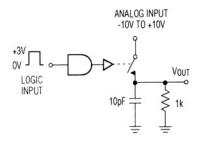


Figure 1. Switching Time

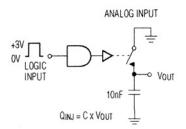


Figure 2. Charge Injection

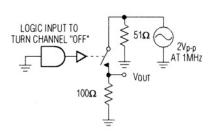
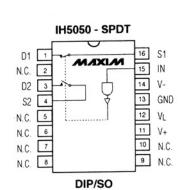


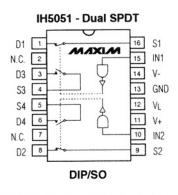
Figure 3. Off-Isolation Rejection Ratio

Pin Configurations & Switching-State Diagrams (continued)



SWITCH STATES ARE FOR LOGIC "1" INPUTS (POSITIVE LOGIC)

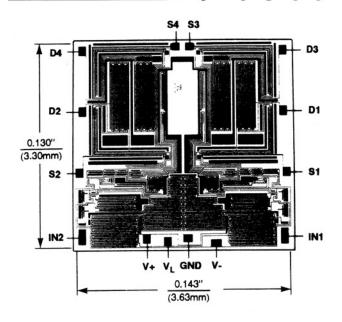
TOP VIEW



LOGIC	SWITCH 1	SWITCH 2
0	OFF	ON
1	ON	OFF

LOGIC	SWITCH 1, SWITCH 2	SWITCH 3, SWITCH 4
0	OFF	ON
1	ON	OFF

Chip Topography



Ordering Information (continued)

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IH5051MJE	-55°C to +125°C	16 CERDIP**

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